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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/624,319	07/24/2000	John E. Smece	PA000343	6628

23696 7590 08/06/2004

Qualcomm Incorporated
Patents Department
5775 Morehouse Drive
San Diego, CA 92121-1714

EXAMINER

LIU, SHUWANG

ART UNIT	PAPER NUMBER
2634	12

DATE MAILED: 08/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/624,319

Applicant(s)

SMEE ET AL.

Examiner

Shuwang Liu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 6-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,6-13,33-35, 38-49,51 and 52 is/are rejected.
- 7) ☒ Claim(s) 3,14-32,36,37 and 50 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 6 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are depend on the cancelled claim 5.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors

Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology

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Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 48 and 49 are rejected under 35 U.S.C. 102(e) as being anticipated by Liang et al. (US 6,314,147).

As shown in figures 1-3 and 5, Liang et al. discloses:

(1) regarding claim 48:

a receiver comprising:

one or more pre-processors (90 in figure 1) operative to receive and process the one or more signals to provide one or more streams of samples (column 5, lines 45- 67);

an equalizer (100, figure 2 or figure 5) coupled to the one or more pre-processors and operative to receive, combine, and equalize the one or more streams of samples to generate symbol estimates;

a post processor (decoder not shown in the figures and see figure 1, it is inherent to use a processor to recovery the information signal from symbol s) coupled to the equalizer and operative to receive and process the symbol estimates; wherein the equalizer includes

one or more multipliers (144 in figure 3) respectively coupled to the one or more pre-processors, each multiplier operative to receive and multiply a

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respective stream of samples with a respective scaling factor (W_{opt}) provided by 220) to provide scaled samples (output from 276), and

a summer (146) coupled to the one or more filters and operative to receive and sum the filtered samples from one or more filters to provide the symbol estimate; and

a filter (210) coupled to the summer and operative to receive and filter the summed samples with a set of coefficients (h_{opt}) to provide the symbol estimates;

(2) regarding claim 49:

wherein the equalizer further includes a coefficients adjust element as recited in claim (220).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 8-13, 33-35, 38-47 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Serizawa et al. (US 5,283,531) in view of Schramm (US 5,812,601)

As shown in figures 20, 28, 32, 33, 37 and 39, Serizawa et al. discloses a method for processing one or more signals in a communication system, the method comprising:

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(1) regarding claims 1 and 33:

receiving and processing the one or more signals to provide one or more streams of samples (by 822) (column 30, line 53-column 31, line 40 and see figure 28); and

first processing (823) the one or more streams of samples to provide a first stream of recovered symbols (column 30, line 53-column 31, line 40, column 8, lines 1-6 and column 10, lines 14-25), wherein the first processing includes

equalizing (with adaptive equalizer) the one or more streams of samples with an equalizer (see 823) to generate symbol estimates (output from 823), and

processing (demodulator 823) the symbol estimates to provide the first stream of recovered symbols;

second processing (824) a multipath of the one or more streams of samples a demodulator;

estimating (826 and see figure 20) a signal quality associated with each of the first and second processing (column 31, lines 21-40); and

selecting (825) the first or second processing based on estimated signal qualities associated therewith (column 30, line 53-column 31, line 40).

(2) regarding claims 38, 40 and 52:

A receiver (figure 39) comprising:

one or more pre-processors (254, 262 and 264 in figure 32) operative to receive and process the one or more signals to provide one or more streams of

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samples;

an equalizer (266) coupled to the one or more pre-processors and operative to receive, combine, and equalize the one or more streams of samples to generate symbol estimates (column 30, line 53-column 31, line 40, column 8, lines 1-6 and column 10, lines 14-25);

a post processor (696 in figure 37) coupled to the equalizer and operative to receive and process the symbol estimates to provide a first stream of recovered symbols); and

second processing (824) a multipath of the one or more streams of samples with a demodulator;

a controller (120) operative to receive estimates of a signal quality associated with each of the first and second streams of recovered symbols, and selecting (124 and 122) the first or second processing based on estimated signal qualities associated therewith.

(3) regarding claim 41:

A receiver (figure 39) comprising:

one or more pre-processors (254, 262 and 264 in figure 32) operative to receive and process the one or more signals to provide one or more streams of samples;

an equalizer (266 and figure 33) coupled to the one or more pre-processors and operative to receive, combine, and equalize the one or more streams of samples to generate symbol estimates (column 30, line 53-column 31, line 40, column 8, lines 1-6 and column 10, lines 14-25); wherein the

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equalizer includes

one or more filters (274 and 276 and 284 in figure 33) respectively coupled to the one or more pre-processors, each filter operative to receive and filter a respective stream of samples with a set of coefficients to provide corresponding filtered samples, and

a summer (278) coupled to the one or more filters and operative to receive and sum the filtered samples from one or more filters to provide the symbol estimate;

a post processor (696 in figure 37) coupled to the equalizer and operative to receive and process the symbol estimates to provide a first stream of recovered symbols); and

second processing (824) a multipath of the one or more streams of samples with a demodulator;

Serizawa et al. discloses all of the subject matter as described above except for specifically teaching the demodulator comprising one or rake receiver as claimed.

Schramm, in the same field of endeavor, teaches demodulator could be replaced by a rake receiver (column 2, lines 27-35).

It would be desirable to use a rake receiver that processes multiple instances of the received signal in the spread spectrum communication system. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to replace the demodulator of Serizawa et al. by a rake receiver as taught by Schramm in order to allow the receiver to demodulate

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spread spectrum signal with multiple instances. In doing so, the signal quality of the output signal of the demodulator will be improved.

(4) regarding claim 8:

wherein for the first processing, the equalizer is performed prior combining (see figure 33).

(5) regarding claim 9:

wherein for the first processing, the combining is performed prior the equalizing (see figure 11).

(6) regarding claims 10-12 and 34:

further comprising:

adapting coefficients of each of one or more filters within the equalizer (figures 11 and 33), wherein the adapting is performed for each filter based on filtering samples from the filter (see figure 11).

(7) regarding claims 13 and 35:

wherein the coefficients of each filter within the equalizer are initialized using information derived from the one or more rake receiver (column 25, line 41-column 26, line 19)

(8) regarding claim 39:

further comprising:

one or more rake receivers (824) coupled to the one or more pre-processors and operative to receive and process the one or more streams of samples to generate a second stream of recovered symbols.

(9) regarding claim 42:

wherein the equalizer further includes a coefficient adjustment element (284) coupled to the one or more filters (274 and 276) and operative to adapt one or more sets of coefficients for the one or more filters (see figure 33).

(10) regarding claim 43:

wherein the coefficient adjustment element (274) is operative to adapt the set of coefficients for each filter based on the filtered samples received from the filter (figure 3, column 25, line 41-column 26, line 19 and figure 33).

(11) regarding claim 44:

wherein the coefficient adjustment element is operative to adapt the one or more sets of coefficients for the one or more filters based on the symbol estimates (figures 33, column 25, line 41-column 26, line 19).

(12) regarding claim 45:

a slicer (28) coupled to the summer (278) as recited in claim (figure 33).

(13) regarding claim 46:

wherein the coefficient adjustment element is operative to implement an adaptation algorithm selected from the group consisting of least mean square (LMS), recursive least square (RLS), and direct matrix inversion (DMI) algorithms (figure 33, column 25, line 41-column 26, line 19).

(14) regarding claim 47:

wherein the equalizer further includes one or more multipliers respectively coupled to the one or more filters, each multiplier operative to receive and multiply the filtered samples with a respective scaling factor to provide scaled samples, and wherein the summer couples to the one or more

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multipliers and is operative to receive and sum the scaled samples from the one or more multipliers to provide the symbol estimates (figure 33).

8. Claims 2 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Serizawa et al. (US 5283531) and Schramm as applied in claims 1 and 38 above, further in view of Visotsky et al. (US 6,175,588).

Serizawa et al. discloses all of the subject matter as described above except for specifically teaching a PN despreader and a deconvolution element composed in the post processor as claimed.

Visotsky et al., in the same field of endeavor, teaches a processor comprising a despreader (106) and a deconvolution element (130) as recited in claim.

It would be desirable to have the high data rate and bandwidth efficiency in the communication system by using CDMA. One skilled in the art would have clearly recognized that in order to enable the mobile station to implement synchronous acquisition and tracking operations, a pilot signal is superimposed on the data symbol sequence. It is also well known that the orthogonal sequences currently used in CDMA system are Walsh codes of length 64. Walsh codes are used in forward CDMA link to separate users. In any given sector, each forward code channel is assigned a distinct Walsh code. The receiver despreads the chips by using the same Walsh code used at the transmitter so that the symbols or digits are recovered without any error. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the processor of Visotsky et al. with the despreader and the deconvolution

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to the demodulator of Serizawa et al. and Schramm in order to allow the receiver to demodulate spread spectrum signal with high data rate and bandwidth efficiency. In so doing, the receiver facilitates the synchronization for demodulating of the spread spectrum signal so that the quality of the received data is improved. Furthermore, in so doing, the receiver facilitates separating different users from the composite spread signal so that the channel security is improved and the data can be recovered without errors.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shuwang Liu whose telephone number is (703) 308-9556.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin, can be reached at (703) 305-4714.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9306 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121

Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or

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proceeding should be directed to the Technology Center 2600 Customer

Service Office whose telephone number is (703) 306-0377.



Shuwang Liu
Primary Examiner
Art Unit 2634

July 30, 2004